

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of	:
	:
Martin ELLER	:
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Application No. 10/805,272	: <b>EXAMINING</b>
	: <b>GROUP 3742</b>
Filed: March 22, 2004	:
	: Examiner: Fastovsky
For: METHOD OF JOINING A ROD-SHAPED HEATING	:
ELEMENT WITH A TUBULAR CARRIER ELEMENT,	: Confirmation No. 8981
AND A GLOW PLUG INCLUDING A ROD-SHAPED	:
HEATING ELEMENT IN A TUBULAR CARRIER	:
ELEMENT	:

**APPEAL BRIEF**

Mail Stop: APPEAL  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The following is presented in furtherance of the appeal instituted by the Notice of Appeal filed August 8, 2006, in connection with the above-captioned patent application.

**(i) Real Party in Interest**

The real part in interest is the assignee, the German firm of BERU AG of Ludwigsburg, Germany.

**(ii) Related Appeals and Interferences**

There are no related appeals or interferences.

**(iii) Status of Claims:**

Claims 1-3, the only claims pending, stand rejected.

(iv) Status of Amendments

No amendments were filed after the final rejection. All prior amendments have been entered.

(v) Summary of Claimed Subject Matter

Claim 1 recites a glow plug, as shown in Figs. 1 & 2, that comprises a rod-shaped heating element (glow pencil) 1 which is composed of an electrically conductive ceramic material (paragraph [0013], page 3); a carrier ring 2 composed of an electrically conductive material that is attached to the rod-shaped heating element 1 (paragraph [0013], page 3); and a tubular casing (body 3) attached to the carrier ring 2 so as to surround the rod-shaped heating element 1 and the carrier ring 2 (paragraph [0014], page 3; Fig. 2). The attachment of the carrier ring 2 to said rod-shaped heating element 1 is a connection that has been formed by a magnetic forming process (paragraph [0006], page 2 and paragraph [0014], page 3) as a result of which the carrier ring and rod-shaped heating element are in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment (see, Evidence Appendix; paragraph no. 3 of the Declaration Under 35 USC § 1.132 submitted on December 22, 2005).

.As set forth in claim 2, which depends from claim 1, the tubular casing 3 has also been attached to the carrier ring 2 using a magnetic forming process (paragraph [0014], page 3) as a result of which the carrier ring 2 and tubular casing 3 are also in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment.

Claim 3 is directed to an alternative embodiment in which, as shown in Figs. 3-5, the glow plug has, in addition to the features noted relative to the embodiment of Figs. 1 & 2, a contact sleeve 6 composed of an electrically conductive material which is attached to the rod-shaped heating element 1 in an area adjacent to a connection side thereof (i.e., the end connected to the internal pole 5; see, Figs. 3 & 4) so as to axially extend therefrom, the contact sleeve being having been attached to the rod-shaped heating element by a magnetic forming process (paragraph [0016], page 3) as a result of which the contact sleeve 6, like the carrier ring 2, is in a plastically deformed state which is free of surface damage and thermal

effects of being heated during attachment. Furthermore, the cylindrical carrier ring 2 has an external diameter which is greater than that of the contact sleeve 6 (page 4, paragraph [0017], second sentence; Figs. 3 & 4).

(vi) Grounds of the Rejection to be Reviewed

(a) Claims 1 & 2 has been alternatively rejected under 35 U.S.C. §§ 102/103 based on the disclosure of the Bailey patent.

(b) Claims 1 & 2 have been rejected under 35 U.S.C. § 103 based on the disclosure of the Bailey patent in combination with the Magnetopuls brochure.

(c) Claims 1-3 were rejected under 35 U.S.C. § 103 based on the disclosure of the Hausner et al. patent with the Magnetopuls brochure.

(vii) Argument

(a) Rejection of claims 1 & 2 under 35 U.S.C. §§ 102/103 based on the disclosure of the Bailey patent.

Claims 1 & 2 has been alternatively rejected under 35 U.S.C. §§ 102/103 based on the disclosure of the Bailey patent with reliance upon MPEP § 2113 and the case of *In re Thorpe* with regard to the treatment of product-by-process claims being used as justification for not giving weight to the recitations defining that attachments are produced by a magnetic deformation process. This rejection and the reference to product-by-process claims are inappropriate for the following reasons.

Neither claim 1 nor claim 2 can properly be considered a product-by-process claim as that term is normally used, and moreover, the more relevant case and comments contained in MPEP § 2113 state:

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding "interbonded by interfusion" to limit structure of the claimed

composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.) [Emphasis added.]

In the same manner that cited case held that terms such as 'welded,' 'intermixed,' 'ground in place,' 'press fitted,' and 'etched' are capable of construction as structural limitations," it is submitted that "magnetic deformation" similarly defines structural limitations that should be considered in assessing the patentability of the present claims, i.e., that the product will be free of surface damage and the thermal effects of being heated during attachment.

Also relevant to the weight that should be given to process steps in product claims is the case of *In re Hallman*, 210 USPQ 609, 611 (CCPA 1981) in which it was held that:

Product claims may be drafted to include process steps to wholly or partially define the claimed product. In *e Luck*, 476 F.2d. 650, 177 USPQ 523 (CCPA 1973). To the extent that the process limitation distinguish the *products* over the prior art, they must be given the same consideration as traditional product characteristics. (Emphasis in original).

In the present case, the process limitation does distinguish the present invention from the prior art because, in Bailey's glow plug, the "undulated compliant sleeve 46 is brazed at its first alternate and second alternate undulations 48, 49 between the surface ignition element first end portion 32 and the body second end portion 28" (column 6, lines 51-55) and such a method of connection inherently results in the parts being thermally treated in the area at which the brazing is performed. In contrast, when parts are joined by magnetic deformation, no thermal treatment effects result since as noted above, the parts are cold during magnetic deformation. Furthermore, with brazing, the elements are merely joined at the bonding points so that the connection that results is resilient from bonding only the peaks of a undulated compliant sleeve, while the plastic deformation produced by a magnetic deforming process is rigid without the resiliency that is deliberately sought by Bailey since joining occurs along the entire interface of the parts.

These noted physical differences that inherently result from the difference between the manner in which applicant forms his attachments and the manner in which Bailey produces his, are clearly reflected in the language of the claims which indicate that the product is "in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment." In this regard, the Board's attention is directed to paragraph no. 3 of the Declaration Under 35 USC § 1.132 submitted on December 22, 2005

(Evidence Appendix), in which it is stated that “parts that are joined by magnetic pulse forming, inherently, will be physically different from parts joined by conventional welding, brazing, and press fitting.” In the Examiner’s Response to Arguments of the final Office Action, he has stated that this declaration is insufficient to overcome his rejections since, in his view, “the claimed product appears to be the same or similar to that of the prior art.” How no basis for this conclusion exists and it is directly contrary to the factual evidence presented by way of the 132 declaration where, in paragraph 3, it is stated that:

Because of the characteristics of magnetic welding noted in the preceding paragraph, parts that are joined by magnetic welding, inherently, will be physically different from parts joined by conventional welding, brazing, and press fitting.

Likewise, the Examiner has attempted to further justify his refusal to consider the 132 declaration adequate because supposedly page 3, lines 1 & 2 of the translation of the Magnetopuls brochure indicates that “the magnetic forming process is applied when cylindrical piece is pressed onto another element,” and as a result evidence is required to show that such results in less damage than simple press-fit connects themselves. However, the simple fact is that the Examiner has conveniently ignored the word “primarily” in the statement “*primarily* those in cylindrical shape, which are to be pressed onto another element” found in the translation of the Magnetopuls brochure at the lines cited by the Examiner; the use of the word “primarily” means that it also applies to elements that are not pressed into one another (see, e.g., examples 3 & 5 on page 5 of the brochure), and “pressing” is not synonymous with “press-fitting.” To the contrary, the brochure refers on page 7, below the first picture, to merging of parts:

“with the **MAGNETOPULS**<sup>®</sup> process in a manner that is resistant to high pressure without damaging the surface in a fully automatic production path (no pretreatment and no subsequent treatment are necessary),”

while in paragraph 2 of the 132 declaration, the declarant states that:

Based upon my experience and knowledge of magnetic welding, I can state that it is a know fact that an inherent characteristic of magnetic welding

is that it produces no surface damage to the parts being joined and it is a “cold” process, no thermal effects are experienced by the parts being joined by magnetic welding. Furthermore, these inherent characteristics of magnetic welding are well known to those of ordinary skill in the field joining components.

Moreover, it is illogical for the Examiner to have assumed that press-fitting of the parts must be involved with the present invention which the object of the invention is expressly stated in paragraph [0004], spanning pages 1 & 2, as follows:

The object of the present invention is to provide a method of joining a rod-shaped heating element with a tubular carrier element so as to overcome the aforementioned disadvantageous effects that occur with the pressing-in of the heating element into the carrier element.

Such a statement makes it very clear that the present invention does not involve parts that have been press-fit one into the other. As such, there is no reason to compare parts that have been press-fit and then magnetically welded with those which have only been press-fit since neither case is the subject of the claimed invention, and the Examiner’s requirement for applicant to do so in order to justify the patentability of the present invention was inappropriate and unnecessary given the declaration evidence provided and the nature of the present invention.

For the above reasons, it is submitted that the subject matter of claims 1 & 2 cannot properly be considered to have been anticipated or rendered obvious by the disclosure of the Bailey patent. That is, claim 1 recites that carrier ring has been attached to said rod-shaped heating element using a magnetic forming process and claim 2 recites that the tubular casing has been attached to said carrier ring using a magnetic forming process, while the Bailey patent does not disclose such parts being attached by a connection of this type and the declarant has stated in paragraph 4 that:

To my knowledge, magnetic welding was not used for the joining of parts of a glow plug prior to the invention of the above-captioned application,

nor were the advantages of doing so known to those working in the field of glow plug manufacture.

As such, the present invention as defined in claims 1 & 2 is novel and unobvious over the disclosure of the Bailey patent.

(b) Rejection of claims 1 & 2 under 35 U.S.C. § 103 based on the disclosure of the Bailey patent in combination with the Magnetopuls brochure.

As for the alternative position taken by the Examiner that it would have been obvious to use magnetic forming in view of the Magnetopuls brochure, the Examiner has not met his burden of establishing a reason or motivation which would have made such a modification to Bailey's process obvious.<sup>1</sup> Furthermore, contrary to the Examiner's conclusion are the facts established in paragraph no. 4 of the 132 declaration that magnetic pulse forming was not known for use in joining of parts of a glow plug prior to the present invention nor were the advantages of doing so known to those in the field of glow plug manufacture. Thus, combined with the points noted above relative to the rejection based upon the Bailey patent by itself, it is submitted that there is no support for the Examiner's position and the Examiner's position is inconsistent with the facts of record, so that the invention as defined in claims 1 & 2 should be found to be unobvious over the disclosure of the Bailey patent.

(c) Rejection of claims 1-3 under 35 U.S.C. § 103 based on the disclosure of the Hausner et al. patent with the Magnetopuls brochure.

Claims 1 & 2 were also rejected under 35 U.S.C. § 103, along with claim 3, based on the disclosure of the Hausner et al. patent with the Magnetopuls brochure. All of the

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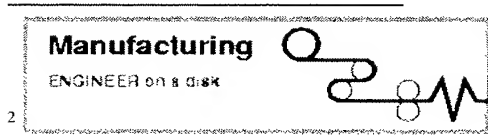
<sup>1</sup> MPEP § 2143 BASIC REQUIREMENTS OF A *PRIMA FACIE* CASE OF OBVIOUSNESS

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

comments and citations relative to the weight which must be given to the magnetic forming recitation of the present claims applies to this rejection as well, as do the comments concerning how the Examiner's positions are contrary to the evidence of paragraphs 3 & 4 of the Declaration Under 35 USC § 1.132 submitted on December 22, 2005, as to the physical differences between a press-fit connection and magnetic deformation connection as well as to the unobviousness of applying the Magnetopuls process to the Hausner et al. patent. Thus, in a similar manner, the magnetic forming recitation of each of the appealed claims also structurally distinguishes the present invention of each of claims 1, 2, & 3 from that of the Hausner et al. patent.

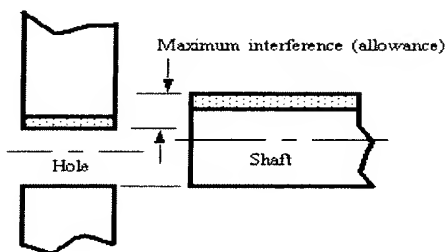
In particular, the Hausner et al. patent discloses that its parts are joined by a press fit type connection (paragraph spanning columns 1 & 2). A press fit connection (also known as an interference fit) inherently results in at least one of the parts that are so joined being scuffed because the inner part has an outer diameter that is slightly larger than the inner diameter of the part that it is being pressed into<sup>2</sup>, scuffing damages the corrosion protection of the joined parts (e.g., the force of being joined together would damage the coating applied to



Version 1.0, August 31, 2001, Copyright, Hugh Jack 1993-2001

### 36.1.3 INTERFERENCE FITS

- Interference fits always overlap and are used mainly for press fits where the two parts are pushed together, and require no other fasteners
- The figure below shows an interference fit for a hole shaft pair





the plug body). In contrast, magnetic forming produces “a noncontact deformation of workpieces” (translation of the Magnetopuls brochure, page 2) and provides a uniformly rigid attachment over the entire area of the joint without any surface damage, as noted above.

Still further, relative to claim 3, in addition to the magnetic deformation attachment feature, this claim requires that the “cylindrical carrier ring has an external diameter which is greater than that of the contact sleeve” and the specification indicates at paragraph [0017] that this is done “so that the glow plug body 3 does not physically contact the contact sleeve 6,” relative to which it needs to be insulated. The sleeve 4 to which the Examiner makes reference in his rejection is not a “contact” sleeve<sup>3</sup>, but rather is a holder for an insulating ring 5 (column 2, lines 3-5 of Hausner et al.) and while applicant’s tubular casing has “been attached to said cylindrical carrier ring by a magnetic forming process *so as not to physically contact said contact sleeve*,” sleeve 4 of Hausner et al. clearly is shown in Fig. 1 as contacting their tubular casing 7. Still further, claim 3 indicates that the applicant’s sleeve axially extends from the claimed rod-shaped heating element (as is shown in Figs. 3 & 4 of the present application and stated in the quotation contained in footnote 3). On the other hand, that is clearly not the case for sleeve 4 relative to Hausner et al.’s heating rod 1, being located entirely intermediate the ends of the heating rod.

Moreover, the Hausner et al. patent must be considered as teaching away from the present invention in that it teaches the very type of press-fitting process that the above quoted object of the present invention states possesses the disadvantages that the present invention seeks to avoid.

Thus, the claims structurally distinguish their subject matter from that of the Hausner et al. patent and cannot properly be considered to have been rendered obvious by the disclosure of the Hausner et al. patent so that this rejection of the claims lacks any supporting basis in the facts as they exist.

### Conclusion


On the basis of the foregoing, all of the Examiner’s rejections should be reversed and such action is hereby requested.

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<sup>3</sup> Paragraph [0019] of the present application states that the “contact sleeve 6, which projects from the glow plug body 3, is designed as a negative-contact connection while the glow plug casing 3 is potential-free.”

The brief fee set forth in 37 CFR § 41.20(b)(2) is authorized to be charged to the Deposit Account No. 50-2478(740116-378) of the undersigned's firm in a separate paper that accompanies this Brief. However, should that paper be missing, this paragraph should be construed as containing such an authorization.

Respectfully submitted,

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Claims Appendix

1. A glow plug comprising:

a rod-shaped heating element, said rod-shaped heating element being composed of an electrically conductive ceramic material;

a carrier ring attached to said rod-shaped heating element, said carrier ring being composed of an electrically conductive material; and

a tubular casing attached to said carrier ring so as to surround said rod-shaped heating element and said carrier ring,

wherein said carrier ring has been attached to said rod-shaped heating element using a magnetic forming process as a result of which the carrier ring and rod-shaped heating element are in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment.

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2. The glow plug according to claim 1, wherein the tubular casing has been attached to said carrier ring using a magnetic forming process as a result of which the carrier ring and tubular casing are in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment.

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3. A glow plug comprising:

a rod-shaped heating element, said rod-shaped heating element being composed of an electrically conductive ceramic material;

a cylindrical carrier ring for attachment to said rod-shaped heating element, said cylindrical carrier ring being composed of a magnetically-deformable material and having an outer circumferential surface thereof being electrically insulated;

a contact sleeve for attachment to said rod-shaped heating element in an area adjacent to a connection side thereof so as to axially extend therefrom, said contact sleeve being composed of an electrically conductive material;

a tubular casing for surrounding said rod-shaped heating element, said cylindrical carrier ring and said contact sleeve, said tubular casing having been attached to said cylindrical carrier ring by a magnetic forming process so as not to physically contact said contact sleeve, and as a result of which the carrier ring and tubular casing are in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment,

wherein said contact sleeve and cylindrical carrier ring have been attached to said rod-shaped heating element by a magnetic forming process as a result of which the carrier ring and contact sleeve are in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment , and

wherein said cylindrical carrier ring has an external diameter which is greater than that of the contact sleeve.

Evidence Appendix

Declaration Under 35 USC § 1.132 submitted on December 22, 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Martin ELLER

Application No. 10/805,272

Filed: March 22, 2004

For: METHOD OF JOINING A ROD-SHAPED HEATING  
ELEMENT WITH A TUBULAR CARRIER ELEMENT,  
AND A GLOW PLUG INCLUDING A ROD-SHAPED  
HEATING ELEMENT IN A TUBULAR CARRIER  
ELEMENT

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Examiner: Fastovsky

Confirmation No. 8981

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office: Fax No. 571-273-8300 on 12-22-05.

  
Kathleen M. McManus

DECLARATION UNDER 37 CFR 1.132

U.S. Patent and Trademark Office  
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401 Dulany Street  
Alexandria, VA 22314

Sir:

I, Dr.-Ing. Eberhard Rauschnabel, declare that:

1. I am the managing director of the Ifutec® Ingenieurbüro für Umformtechnik GmbH, a German company working on the field of forming processes, in particular joining processes by deforming and magnetic forming processes and that I am a graduated ingenieur.

2. Based upon my experience and knowledge of magnetic pulse forming, I can state that it is a known fact that an inherent characteristic of magnetic pulse forming is that it produces no surface damage to the parts being joined if the parameters are well adjusted to the specific application and as it is a "cold" process, no thermal effects are experienced by the parts being joined by magnetic pulse forming. Furthermore, these inherent characteristics of magnetic pulse forming are well known to those of ordinary skill in the field joining components.

3. By referencing the "MagnetoPuls" process of Magnet-Physik Dr. Steingroever GmbH of Cologne, Germany, in paragraph [0006] of the above-captioned application, those skilled in the art were taught that the process taught for use in accordance with the above-captioned application would yield a product having the known characteristics of the "MagnetoPuls" process as are describe in published literature about that process, such as the 1997 "MagnetoPuls" brochure number 1846/97, i.e., that the product would have no surface damage and that the product would not have been subjected to any thermal effects.

3. Because of the characteristics of magnetic pulse forming noted in the preceding paragraph, parts that are joined by magnetic pulse forming, inherently, will be physically different from parts joined by conventional welding, brazing, and press fitting.

4. To my knowledge, magnetic pulse forming was not used for the joining of parts of a glow plug prior to the invention of the above-captioned application, nor were the advantages of doing so known to those working in the field of glow plug manufacture.

All statements made herein of my own knowledge are true, all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

Date: December 16, 2005



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[Dr.-Ing. Eberhard Rauschnabel]

Related Proceeding Appendix

None